EFFECT OF METACOGNITION ORIENTATION PROGRAMME ON ACADEMIC ACHIEVEMENT, STUDY HABITS AND SELF-EFFICACY OF IX GRADE STUDENTS ACROSS THE LEVELS OF INTELLIGENCE

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1.0.0 INTRODUCTION

Conscious individuals are able to take part in society only if they are armed with self-knowledge ability. The efforts for educating conscious individuals began to follow a more meaningful trend, with appearance of metacognition and the studies done in this connection. Learners usually have some problems in deciding the amount of time they have to allocate for different tasks while studying. To decide the amount of time they required for the task, learner monitors his/her learning, make decisions regarding the extent to which items have been learned and controls the amount of time allocated based on these decisions.

Cognitive strategies are the basic mental abilities we use to think, study and learn (eg. Recalling information from memory, analyzing sounds and images, making associations between or comparing/contrasting different pieces of information, and making inferences or interpreting text). They help an individual to achieve a particular goal such as comprehending text or solving a problem, and they can be individually identified and measured. In contrast metacognitive strategies are used to ensure that an overarching learning goal is being or has been reached.

Metacognition as "one's knowledge and beliefs about one's own cognitive processes and one's resulting attempts to regulate those cognitive processes to maximize learning and memory". Metacognition plays an important role in communication, reading comprehension, language acquisition, social cognition, attention, self-control, memory, self-instruction, writing, problem solving, and personality development. Metacognition includes knowledge and regulation of one's thinking processes. Metacognition is a special type of knowledge and ability that develops with personal experience and with schooling. It is in a recursive loop with cognitive development in that it both produces and is a product of cognitive development. Metacognition is often simply defined as, "thinking about thinking" or a higher thinking method. Metacognition involves activities such as planning how to approach a learning task, monitoring comprehension, and evaluating the progress. People in their everyday basis use Metacognition. For example, after reading a paragraph the reader may ask himself questions about the text. If the reader cannot answer his own questions then he must go back and reread the text for better understanding. Although related, cognition and metacognition differ: Cognitive skills are those needed to perform a task whereas metacognitive skills are necessary to understand

how it was performed. Successful adult learners employ a range of metacognitive skills, and effective teachers of adults attend to the development of these skills.

Metacognition refers to higher order thinking which involves active control over the cognitive processes engaged in learning. Activities such as planning how to approach a given learning task, monitoring comprehension and evaluating progress towards the completion of a task are metacognitive in nature. Because metacognition plays a critical role in successful learning, it is important to study metacognitive activity and development to determine how students can be taught to better apply their cognitive resources through metacognitive control. Flavell (1979) first used the word 'metacognition'. He described in these words: metacognition refers to one's knowledge concerning one's own cognitive process or anything related to them for example the learning related properties of information or data. Metacognition is an important part of intentional learning, since it involves actively thinking about what you know, what you don't know, and how you can get better at knowing and applying what you know. Metacognition is defined as "cognition about cognition", or "knowing about knowing." It can take many forms; it includes knowledge about when and how to use particular strategies for learning or for problem solving.

- Metacognition refers to learners' automatic awareness of their own metacognitive reading strategies
- Knowledge and their ability to understand, control, and manipulate their own cognitive processes.
- Metacognition refers to a level of thinking that involves active control over the process of thinking that is used in learning situations. Planning the way to approach a learning task, monitoring comprehension, and evaluating the progress towards the completion of a task: these are skills that are metacognitive in their nature.
- Different fields define metacognition very differently. Metacognition variously refers to the study of memory-monitoring and self-regulation, consciousness/awareness and auto-consciousness/self-awareness.

Metacognitive Strategies

“A metacognitive strategy is a systematic cognitive technique to assist students in recognizing, planning, implementing and monitoring solutions to problems.” (Smith Steven W, 1992). The basic metacognitive strategies are-

- Connecting new information to former knowledge.
- Selecting thinking strategies deliberately.
- Planning, monitoring, and evaluating thinking processes.

A thinking person is in charge of his behaviour. He determines when it is necessary to use metacognitive strategies. He selects strategies to define a problem situation and researches alternative solutions. He tailors this search for information to constraints of time and energy. He monitors, controls and judges his thinking. He evaluates and decides when a problem is solved to a satisfactory degree or when the demands of daily living take a temporary or permanent higher priority. In practice these capacities are used to regulate one's own cognition, to maximize one's potential to think, learn and to the evaluation of proper ethical/moral rules. According to Flavell (1979) metacognition consists of both metacognitive knowledge and metacognitive experience or regulation.

Metacognitive Knowledge

Knowledge of person variable refers to general knowledge about how human beings learn and process information, as well as individual knowledge of one's own learning processes. Knowledge of task variables includes knowledge about the nature of the task as well as the type of processing demands that it will place up on the individual knowledge about strategy variables includes knowledge about both cognitive and metacognitive strategies as well as conditional knowledge about when and where it is appropriate to use such strategies (Livingston, 1997).

Metacognitive Regulation

Metacognitive experience involves the use of metacognitive strategies on metacognitive regulation (Brown 1987) Metacognitive strategies are sequential processes that one uses to control cognitive activities, and to ensure that a cognitive goal (e.g. understanding a text) has been met. These processes help to regulate and oversee learning and consists of planning and monitoring cognitive activities, as well as checking the outcomes of these activities (Livingston, 1997).

METACOGNITION AND ACADEMIC ACHIEVEMENT

Academic achievement has become an index of a child’s future. Therefore it is putting a great pressure on the minds of children and their parents. Aacademic achievement is a function of cognitive and non cognitive aspects of personality. Metacognition is a strong predictor of academic success and problem-solving ability (Dunlosky and Thiede, 1998). Students who are able to effectively discriminate between information they have learned

and information they have not learned are more likely to review and learn new information (Everson and Tobias, 1998). If students believe they know everything for the test, they will probably end their studies. Premature cessation of studying before learning is completed will most likely result in poor performance. Fortunately, students with poor metacognition are not doomed to poor learning and inadequate performance. A vast body of research has consistently shown that metacognitive training, in addition to task-based training, is effective in improving learning and performance outcomes (Thiede et al., 2003; Krugar and Dunning, 1999, Leisure, 1997; Kohler, 2002). Metacognition research has shown that metacognition is an important predictor of academic achievement; students able to effectively distinguish information they know and do not know are more likely to review and retain new information (Dunning, Johnson, Ehrlinger, & Kruger, 2003; Dunlosky & Thiede, 1998; Kruger & Dunning, 1999). Metacognition has been described as a discrepancy-reduction strategy where the learner begins study by setting a specific desired state of learning for the material (Dunlosky & Thiede; Thiede, Anderson, & Therriault, 2003). The student allocates resources to learn new information and monitors the degree to which new material has been learned. Learning is discontinued when the student believes that he or she has mastered the information and achieved the desired state of learning.

METACOGNITION AND STUDY HABITS

According to Lyle Tussing (1962), "Psychologically study habit is automatically learned behavior pattern that enables the students to handle specific type of situations easily. The student who has acquired good study habits has actually developed a behavior pattern which enables him to sit down and design working on his assignments with a minimum of fuss and maximum of concentration."

Study skills are usually defined as students' ability to manage time and other resources to complete an academic task successfully. Study habit is the amount and kinds of studying routines which the student is used during a regular period of study occurred in a conducive environment.

METACOGNITION AND SELF-EFFICACY

Researchers in the field of educational psychology have investigated a number of variables such as goals, self-esteem, self-efficacy, motivation, learning strategies,

metacognition and test anxiety in their relationship to academic performance as these variables influence learning and performance. Recently, among these variables self-efficacy and metacognition are the most foregrounded variables in the educational field.

For example, Kanfer and Ackerman (1989) found that people with strong self-efficacy were more likely to use metacognitive strategies when working on a task and they performed better than those with weak self-efficacy. Similarly, Bouffard-Bouchard, Parent and Larivee (1991) found that students with strong self-efficacy engaged in more metacognitive skills and had better performance scores than students with weak self-efficacy. Bandura and Wood (1989) also found that self-efficacy influenced performance directly and indirectly through its effects on analytical strategies, which suggests a mediating effect of metacognition in the relationship between self-efficacy and performance. More recently, Coutinho (2007) in his study examining relationships among self-efficacy, metacognition and performance found that metacognition is a predictor of self-efficacy, and that self-efficacy is a predictor of performance. Thus, in this study two variables that have been of particular interest to researchers are self-efficacy and metacognition. Self-efficacy is the measure of the belief in one's own ability to complete tasks and reach goals. Psychologists have studied self-efficacy from several perspectives, noting various paths in the development of self-efficacy; the dynamics of self-efficacy, and lack thereof, in different settings; interactions between self-efficacy and self-concept; and habits of attribution that contribute to, or detract from, self-efficacy.

Self-efficacy affects every area of human endeavour. By determining the beliefs a person holds regarding his or her power to affect situations, it strongly influences both the power a person actually has to face challenges competently and the choices a person is most likely to make. These effects are particularly apparent, and compelling, with regard to behaviours affecting health.

1.1.0 EMERGENCE AND JUSTIFICATION OF THE STUDY:

Study after study gave a glimpse of the fact that metacognitive skills can be taught to improve the learning of students. (Nietfeld & Shraw, 2002; Thiede, Anderson, & Therriault, 2003). But the question here is ‘why do we even need metacognitive skills? And the researches answered it by the fact that individuals with well developed metacognitive skills can think through a problem or approach a learning task, select appropriate strategies, and make decisions about a course of action to resolve the problem or successfully perform the task. They often think about their own thinking processes,

taking time to think about and learn from mistakes or inaccuracies. (NCREL, 1995). Some instructional programs that encourage students to learn metacognitive strategies encourage students to engage in "metacognitive conversations" with themselves about their learning, the challenges they encounter, and the ways in which they can self-correct and continue learning. (TEAL Central Staff, 2010)

Metacognition is the term which is related to the academic aspect of learner, i.e. the more conscious a learner is about his/her learning, the more efficient he/she should perform academically as suggested by the theoretical perspectives. This has been proved by some researches as well; Thiede (2003) concluded in his study that Metacognition is a strong predictor of academic success and problem-solving ability. A number of researches have shown that metacognitive training, in addition to task-based training, is effective in improving learning and performance outcomes. (Thiede, 2003; Krugar and Danning, 1999; Leisure, 1997; Kohler, 2002)**.**

RESEARCHES ON METACOGNITION IN INTERNATIONAL PERSPECTIVES:

S.No.	Year	Name of the Researcher	Researches
1.	2002	Mohamed	Metacognition and reading attitude of university students
2.	2003	Monos	Metacognitive online reading strategies employed by Hungarian university students
3.	2006	Kamhaeng	Reading strategies in high and low achievement students
4.	2008	Cubukcu	Effectiveness of systematic direct instruction of multiple metacognitive strategies
5.	2008	Steven Shannon	Using metacognitive strategies and learning styles to create self-directed learners
6.	2009	Kaniz	Significance of Metacognition in second language learning
7.	2009	Suphawat	Metacognitive online reading strategies among Thai students
8.	2010	Alireza	Investigate the metacognitive awareness and perceived use of strategy among EFL and ESL

9.	2011	Clarisse	Relationship between Metacognition and text comprehension

RESEARCHES ON METACOGNITION IN NATIONAL PERSPECTIVES:

S.No.	Year	Name of the Researchers	Research
1.	2009	Annalakshmi Narayanan	Resilence, Metacognition and Complexity
2.	2012	Y.N. Sridhar	Effectiveness of performance assessment on metacognitive skills.
3.	2013	Dr. Suresh T. Kotwani	Metacognitive awareness of primary teachers.

Metacognition makes the person conscious of his actions, more aware of the prospective outcomes of present deeds. Individuals are supposed to adopt favourable study habits, if he has an optimum level of metacognitive skills. The self-efficacy is person's ability to attain a desired outcome by taking necessary steps. (Bandura,1994). High self-efficacy reflects high energy applied in analyzing and resolving problems, on the other hand low/weak self-efficacy become preoccupied with evaluation concerns, doubt their skills and abilities and without even putting the efforts to a given problem, anticipate failure. (Bandura & Wood, 1989). It is clear by the discussion that academic achievement, study habits and self-efficacy are related to some or the other domain of Metacognition.

Many researches, some of them quoted in previous pages (like Dunlosky and Thiede(1998), Kruger & Dunning(1999), Kanfer & Ackerman(1989), Bandura(1994) etc. that Metacognition positively effects these variables under study (academic achievement, study habits and self-efficacy). In the present research an orientation programme for ix graders will be developed in which these students will be oriented in metacognitive knowledge, strategies, skills etc. so that they may better use metacognition in their studies. In order to test the efficacy of the developed orientation programme its effect will be studied on dependent variables. If the dependent variables are tempered by this orientation the orientation programme will be treated as effective. Thus the purpose of present research is not to study the effect of metacognition on the dependent variables but the purpose is to what extent the developed metacognition orientation programme (MOP)

under present research will be effective. The criteria of effectiveness of this MOP will be its effect this programme on dependent variables. Intelligence has also been taken as an independent variable in the present research. Researcher wants to learn that developed MOP is more effective with which type of students high, average or low intelligent.

Investigation through the related literature leads to conclusion that Metacognition is very effective in the learning of students and it can improve the academic achievement and study habits and make the students self directed. The above analysis raised some questions in the mind of researcher such as;

- Is the metacognition of ix grade students be enhance by the developed MOP?
- Is the developed MOP effective on academic achievement of students of different levels of intelligence?
- Is the developed MOP effective on study habits of students of different levels of intelligence?
- Is the developed MOP effective on self-efficacy of students of different levels of intelligence?
- Is there any interaction effect of MOP and intelligence on academic achievement, study habits and self-efficacy of students of different levels of intelligence?

1.2.0 STATEMENT OF THE PROBLEM

In order to find out the answers of above mentioned research questions the following problem has been selected for the present study:

EFFECT OF METACOGNITION ORIENTATION PROGRAMME (MOP) ON ACADEMIC ACHIEVEMENT, STUDY HABITS AND SELF-EFFICACY OF IX GRADE STUDENTS ACROSS THE LEVELS OF INTELLIGENCE

1.3.0 OPERATIONAL DEFINITION OF THE TERMS

1.3.1 METACOGNITION

Metacognition refers to awareness of one's own knowledge- what one does and doesn't know and one's ability to understand, control and manipulate one's cognitive processes.

Metacognition refers to higher-order mental processes involved in learning such as creating learning plans, using appropriate skills and strategies to solve a problem, making estimates of performance, and calibrating the extent of learning (Dunslosky & Thiede, 1998).

1.3.2 ACADEMIC ACHIEVEMENT

According to Dictionary of Education (1959), "Academic achievement is the total of marks obtained by the students at his/her academic examinations or it is the teacher's estimate the level of success or the total of marks attained by the students in their efforts to grasp their curricular goals in their academic examination."

1.3.3 STUDY HABITS

Study habit is the amount and kinds of studying routines which the student is used during a regular period of study occurred in a conducive environment.

Crede & Kuncel(2008) defines study habit as study routines, including, but not restricted to, frequency of studying sessions, review of material, self-testing, rehearsal of learned materials, and studying in a conducive environment.

1.3.4 SELF-EFFICACY

Self-efficacy is defined as people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. (Bandura, 1994)

"Self-efficacy is a personal belief of competency, rather than one's emotional reaction to an actual accomplishment." (Nelson & Conner, 2008)

1.3.5 ORIENTATION PROGRAMME

Orientation is an introductory instruction concerning a new situation. The adjustment or alignment of oneself or one's ideas to surroundings or circumstances.

In the present study the researcher want to orient about metacognition to the students of ix grade. The orientation programme will include the concept of metacognition, components, strategies, awareness and methods of developing awareness of metacognition.

1.4.0 OBJECTIVES OF THE STUDY

Following objectives have been formulated for the present study:

1. To develop material on metacognition to orient ix grade students.
2. To study the metacognitive knowledge and skills of ix grade students.
3. To know about the intelligence of ix grade students.
4. To study the effect of metacognition orientation programme (MOP) on academic achievement of ix grade students.
5. To study the effect of metacognition orientation programme (MOP) on study habits of ix grade students.
6. To study the effect of metacognition orientation programme (MOP) on self-efficacy of ix grade students.
7. To study the effect of metacognition orientation programme (MOP) on metacognitive knowledge and metacognitive skills of ix grade students.
8. To study the effect of intelligence on academic achievement of ix grade students.
9. To study the effect of intelligence on study habits of ix grade students.
10. To study the effect of intelligence on self-efficacy of ix grade students.
11. To compare the effect of metacognition orientation programme (MOP) on academic achievement of ix grade students of different levels of intelligence.

12. To compare the effect of metacognition orientation programme (MOP) on study habits of ix grade students of different levels of intelligence.

13. To compare the effect of metacognition orientation programme (MOP) on self-efficacy of ix grade students of different levels of intelligence.

14. To study the interaction effect of metacognition orientation programme (MOP) and intelligence on academic achievement.

15. To study the interaction effect of metacognition orientation programme (MOP) and intelligence on study habits.

16. To study the interaction effect of metacognition orientation programme (MOP) and intelligence on self-efficacy.

1.5.0 HYPOTHESES OF THE STUDY

In order to realize the above objectives of present study following hypotheses have been formulated:

H_0 1: There will be no significant difference between the post test scores of academic achievement of experimental and controlled group.

H_0 2: There will be no significant difference between the post test scores of study habits of experimental and controlled group.

H_0 3: There will be no significant difference between the post test scores of self efficacy of experimental and controlled group.

H_0 4: There will be no significant effect of intelligence on academic achievement.

H_0 5: There will be no significant effect of intelligence on study habits.

H_0 6: There will be no significant effect of intelligence on self-efficacy.

H_0 7: There will be no significant difference between the mean gain academic achievement scores of experimental and controlled group of different levels of intelligence.

H_0 8: There will be no significant difference between the mean gain study habits scores of experimental and controlled group of different levels of intelligence.

H_0 9: There will be no significant difference between the mean gain self-efficacy scores of experimental and controlled group of different levels of intelligence.

H_0 10: There will be no significant interaction effect of MOP and intelligence on academic achievement.

H_0 11: There will be no significant interaction effect of MOP and intelligence on study habits.

H_0 12: There will be no significant interaction effect of MOP and intelligence on self-efficacy.

1.6.0 DELIMITATIONS

In order to make study more specific and methodical it has been delimited to following points:

1. The schools of UP Board from Agra city will be selected for the study.
2. Only Hindi medium schools will be selected for the study.
3. Only ix class will be selected for the study.
4. Only achievement in science will be taken by the researcher.
5. Sample will be limited to 100 students only. (Two sections of ix grade)
6. The content of orientation programme is delimited to :

   I. The concept, components, strategies, awareness and methods of developing awareness of metacognition.

   II. Application of metacognition in stydy of science.

1.7.0 METHODOLOGY OF THE STUDY

The methodology of the study has been stated in the following heads:

1.7.1 VARIABLES OF THE STUDY

The variables of the study have been classified as following:

- **Independent Variables:** Metacognition Orientation Programme and Intelligence
- **Dependent Variable:** Academic Achievement, Study Habits and Self-Efficacy
- **Controlled or Extraneous Variables:** Age, study subject, time of conducting the experiment, teacher, teaching duration, test.

1.7.2 METHOD OF THE RESEARCH

Experimental method of research will be used in present study. According to John W. Best (2001), "*Experimental research is the description and analysis of what will be or what will occur under carefully controlled conditions.*

1.7.3 DESIGN OF THE STUDY

While considering the nature of the problem control group pre-test post-test experimental design will be used in the present study.

GROUP	PRE-TEST	TREATMENT	SCHEDULE	POST-TEST
Experimental (N=50)	Pre-test of ix grade students related to variables- Academic achievement, study habits, self-efficacy, metacognitive knowledge and skills, intelligence	Treatment on ix grade students with MOP.	10 periods of 35 Minutes on orientation about metacognition. 20 periods of 35 minutes teaching lessons based on metacognitive strategies	Post-test of ix grade students related to variables- Academic achievement, study habits, self-efficacy, metacognitive knowledge and skills.
Controlled (N=50)		Teaching in normal way.	20 periods of 35 Minutes.	

In the design of the study there will be two groups i.e. experimental and controlled groups and the pre-test post-test experimental design will be used in the study. In the developmental phase analysis of the classroom situation will be done and developing the material to orient the students and lessons based on metacognitive strategies. In the experimental phase pre-test will be administer related to academic achievement, study habits, self-efficacy, metacognitive knowledge and skills and intelligence.

Treatment to Experimental Group: Experimental group will be given an orientation of 10 days on metacognition in which they will be taught about the concept, components, strategies, skills, metacognitive awareness and methods of developing metacognitive awareness. Further this group will be taught 20 lessons of science on selected topics. These lessons will be developed using metacognitive strategies.

Treatment to controlled Group: Controlled group will be taught 20 lessons using traditional methods like lecture, question answer, demonstration etc. This group will not be provided any knowledge about metacognition.

In the evaluative phase the researcher will administer the post-test related to academic achievement, study habits, self-efficacy and metacognitive knowledge and skills.

The present study will be carried out in three broad phases, the following procedure will be adopted in order to achieve the objectives of the study and to test the hypotheses under investigation-

Phase-1: The Developmental Phase

In the developmental phase researcher will follow these steps-

- Analysis of the classroom situation
- Developing the instructional material on metacognition to orient the ix grade students.
- Planning and selecting/preparation of formative achievement test, study habits, self-efficacy, intelligence, knowledge and skills test

Phase-2: The Experimental Phase

This phase will comprise of the following sub phases:

Pre-test: For this the researcher will administer the pre-test related to variables-

- Academic achievement
- Study habits
- Self-efficacy
- Metacognitive knowledge and skills
- Intelligence

Researcher will orient the Classroom with Metacognition Orientation Programme

Phase-3: The Evaluative Phase

For this the researcher will administer the post-test related to the variable

- Academic achievement
- Study habits
- Self-efficacy
- Metacognitive knowledge and skills

After the post-test the researcher will see the effect of MOP on above variables.

1.8.0 SAMPLE OF THE STUDY

- Purposive sampling will be used for the selection of institution and class.
- 100 students will be selected and further divided into two groups i.e. experimental group (50 students) and control group (50 students) by using simple random sampling method.

SAMPLE OF THE STUDY

School	**Class level/ subject**	**Experimental Group**	**Control Group**
One secondary level school will be selected purposively	IX/ science	50 students (random assignment)	50 students (random assignment)

1.9.0 TOOLS OF THE STUDY

Following tools will be used in the study:

1. Self made Achievement Test on selected topics in science.

2. Study Habit Inventory by Dr. Lajwanti and Prof. NPS Chandel.

3. Self developed tool of self-efficacy.

4. Verbal Intelligence test by R.K. Ojha and Raychoudhary.

5. Self developed Metacognitive knowledge and skills test.

1.10.0 STATISTICAL TECHNIQUE

Following statistical techniques will be used in present study:

1.10.1 DESCRIPTIVE STATISTICS

Certain descriptive statistics will be use in order to describe the nature and distribution of the scores obtained on the various tests so these methods of statistical analysis will use in the present study:

1. ***Mean*****:** The mean value will be computed as a measures of central tendency of the distribution of achievement scores.

2. *Standard Deviation:* This will be computed to study the variation in the scores and to do other various computations.

3. Graphical Representation of data

1.10.2 INFERENTIAL STATISTICS

Inferential statistics will be used in the present study to test the various hypotheses of the study, as well as to draw definite conclusion on the basis of the obtained results:

1. *ANOVA:* It will be used to analyze the differences between group means and their associated procedures (such as "variation" among and between groups).

2. *Post ANOVA:* When the F-ratio is significant or to see whether two or more means are significantly different or not than we use t-test and it is known as post-ANOVA.

1.11.0 SIGNIFICANCE OF THE STUDY

- Classroom learning can be enhanced by using the findings of the study.
- Results of the study can be helpful for developing a better educational plan.
- The findings of the study can develop awareness among teachers and students about metacognition.
- The results of the study can improve the learning styles and achievement of learners.
- Learners can make themselves self directed

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